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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,050	10/02/2003	Kazutaka Shibata	AI 269 D1	7766

7590 07/09/2004

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EXAMINER

NGUYEN, DAO H

ART UNIT PAPER NUMBER

2818

DATE MAILED: 07/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/676,050	SHIBATA, KAZUTAKA	
	Examiner	Art Unit	
	Dao H Nguyen	2818	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5 and 14-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5 and 14-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/970,193.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1003 & 0304</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. In response to the communications dated 10/02/2003 through 03/15/2004, claims 5 and 14-27 are active in this application as a result of the cancellation of claims 1-4 and 6-13.

Acknowledges

2. Receipt is acknowledged of the following items from the Applicant.

a. Information Disclosure Statement (IDS) filed on 10/02/2003 and 03/15/2004 and made of record as Paper No. 1003 and 0304. The references cited on the PTO-892 and PTOL 1449 form have been considered.

Applicant is requested to cite any relevant prior art if being aware on form PTO-1449 in accordance with the guidelines set for in M.P.E.P. 609.

b. Cancellation of claims 1-4 and 6-13. This cancellation was made in the Preliminary Amendment, filed 10/02/2003 and made of record as Paper No. 0903.

c. This application is a Divisional of the U.S. Application Serial No. 09/970,193, filed 10/04/2001.

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Foreign Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the parent Application No. 09/970,193, filed 10/04/2001.

Drawings

4. The drawings are objected to for the following reasons.

Figure 7 not designated by a legend such as "Prior Art". The Legend is necessary in order to clarify what applicant's invention is (see MPEP § 608.02g).

Specification

5. The specification has been checked to the extent necessary to determine the presence of possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

6. Claims 14, 22 and 27 are objected to because of the following reasons:

In claim 14, line 16, and claim 22, line 11, the word "sifted" in the phrase "at sifted positions" should be changed to –shifted– in order to be consistent with the specification, page 12, line 16, or page 13, line 7.

In claim 27, the dependency of the claim is improper since claim 35 does not exist. Therefore, the dependency of claim 27 has been re-directed to claim 26. If Applicant does not agree with this re-direction, an amendment should be made by Applicant.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

8. Claim(s) 5, 14, 16-18, and 22-27 is/are rejected under 35 U. S. C. § 102 (e) as being anticipated by U.S. Patent No. 6,521,987 to Glenn et al.

Regarding claim 1, Glenn discloses a semiconductor device, as shown in figures 2-10 and 12, comprising

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a lead frame 31 having inner connecting portions and outer connecting portions (fig. 10);

a semiconductor chip 52 having electrodes 53 on a surface thereof;

metal wires 54 for electrically connecting the electrodes 53 on the semiconductor chip 52 and the inner connecting portions of the lead frame 31;

a sealing resin 51 for sealing the inner connecting portions of the lead frame 31, the semiconductor chip 52 and the metal wires 54 therein, and at the same time exposing the outer connecting portions of the lead frame 31 at a bottom surface thereof, and

an inner connecting portion sealing resin for covering the inner connecting portion at the bottom side of the sealing resin; wherein

the inner connecting portion sealing resin exists beneath the connecting portion of the inner connecting portion with the metal wires 54;

a head end (65) of the outer connecting portion is substantially in a same plane with a side surface 55 of the sealing resin 51, the head end of the outer connecting portion having no chipped portion.

Regarding claim 14, Glenn discloses a semiconductor device, as shown in figures 2-10 and 12, comprising

a lead frame 31 having inner connecting portions and outer connecting portions (fig. 10);

a semiconductor chip 52 having electrodes 53 on a surface thereof;

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metal wires 54 for electrically connecting the electrodes 53 on the semiconductor chip 52 and the inner connecting portions of the lead frame 31;

a sealing resin 51 for sealing the inner connecting portions of the lead frame 31, the semiconductor chip 52 and the metal wires 54 therein, and at the same time exposing the outer connecting portions of the lead frame 31 at a bottom surface thereof, and

an inner connecting portion sealing resin for covering the inner connecting portion at the bottom side of the sealing resin; wherein

the inner connecting portion sealing resin exists beneath the connecting portion of the inner connecting portion with the metal wires;

each of the metal wires 54 is bonded to an upper surface of the inner connecting portion;

a lower surface 66 of the inner connecting portion is offset inwardly of the sealing resin with respect to the bottom surface of the sealing resin;

a lead terminal portion 30 (fig. 2) including the inner connecting portion and the outer connecting portion has a wide portion 36 and a narrow portion at shifted portions in the longitudinal direction thereof in plan view (see also column 5, lines 1-9, and lines 44-47); and

a part of the sealing resin enters an underside of the inner connecting portion to form the inner connecting portion sealing resin.

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Regarding claim 16, Glenn discloses the semiconductor device in which a step is formed between a lower surface of the outer connecting portion and the lower surface of the inner connecting portion. See figure 10.

Regarding claim 17, Glenn discloses the semiconductor device in which a tapered surface, which comes upwardly as it comes inwardly of the sealing resin, is provided between a lower surface of the outer connecting portion and the lower surface of the inner connecting portion. See figures 2-10.

Regarding claim 18, Glenn discloses the semiconductor device in which a bottom surface of the outer connecting portion is exposed from the bottom surface of the sealing resin to form an outer lead portion. See figures 2-10.

Regarding claim 22, Glenn discloses a lead frame, as shown in figures 2-10 and 12, comprising:

- a supporting portion 22 for supporting a semiconductor chip 52 (fig. 10); and
- lead terminal portions 31 each having an inner connecting portion to be electrically connected to the semiconductor chip 52 to be mounted on the supporting portion 22 and an outer connecting portion for outer connection;

- a lower surface 66 of the inner connecting portion being offset with respect to a lower surface 64 of the outer connecting portion so that an inner connecting portion sealing space is defined below the inner connecting portion; wherein

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an area (where wires 54 connected to) for electrically connecting the semiconductor chip is provided above the inner connecting portion sealing space;

the lead terminal portion 30 (fig. 2) has a wide portion 36 and a narrow portion (31/37) at shifted positions in the longitudinal direction thereof in plan view (see also column 5, lines 1-9).

Regarding claim 24, Glenn discloses the lead frame in which a step is formed between the lower surface of the outer connecting portion and the lower surface of the inner connecting portion. See fig. 10.

Regarding claim 25, Glenn discloses the lead frame in which a tapered surface, which comes upwardly as it comes toward the supporting portion, is provided on the lower surface of the inner connecting portion. See figures 2-10.

Regarding claim 26, Glenn discloses the lead frame, as shown in figures 2-10 and 12, comprising:

a supporting portion 22 for supporting a semiconductor chip 52; and

lead terminal portions 31 each having an inner connecting portion to be electrically connected to the semiconductor chip 52 to be mounted on the supporting portion 22 and an outer connecting portion for outer connection;

a lower surface 66 of the inner connecting portion being offset with respect to

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a lower surface 64 of the outer connecting portion so that an inner connecting portion sealing space is defined below the inner connecting portion; wherein

an area (where wires 54 connected to) for electrically connecting the semiconductor chip 52 is provided above the inner connecting portion sealing space;

the lead terminal portion 30 (fig. 2) has a wide portion 36 and a narrow portion (31/37) at shifted positions in the longitudinal direction thereof in plan view (see also column 5, lines 1-9).

Regarding claim 27, Glenn discloses a lead frame in which a tapered surface, which comes upwardly as it comes toward the supporting portion, is provided on the lower surface of the inner connecting portion. See figures 2-10.

Claim Rejections - 35 U.S.C. § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim(s) 15, 19-21 and 23 is/are rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent No. 6,521,987 to Glenn et al., in view of the following remarks.

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Regarding claims 15 and 23, Glenn discloses the semiconductor device comprising all claimed limitations, except for explicitly describing that a part of the lead terminal portion has a cross-section, that is taken along a plane that is perpendicular to the longitudinal direction of the lead terminal portion, in a shape of an inverted trapezoid. However, in column 10, lines 38-44, Glenn teaches that the perimeter of the surface 64 of lead 63 may have a variety of shapes. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Glenn so that it would have a part of the lead terminal portion having a cross-section taken along a plane perpendicular to the longitudinal direction of the lead terminal portion in a shape of an inverted trapezoid in order to facilitate different external connections of the device (see column 10, lines 21-44).

Alternatively, fig. 2 of Glenn shows anchor ears 36 on the lead frame 30. It would have been obvious to one having ordinary skill in the art at the time the invention was made that these anchor ears can be easily modified to have any shape(s), including an inverted trapezoid, as long as such modification provide a prevention of leads 30 from being pulled from the package body (see column 5, lines 1-9), since such modification would involve only routine skills in the art.

Regarding claim 19, Glenn discloses a semiconductor device, as shown in figures 2-10 and 12, comprising:

- a lead frame 31 having inner connecting portions and outer connecting portions;
- a semiconductor chip 52 having electrodes 53 on a surface thereof;

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metal wires 54 for electrically connecting the electrodes 53 on the semiconductor chip 52 and the inner connecting portions of the lead frame 31;

a sealing resin 51 for sealing the inner connecting portions of the lead frame 31, the semiconductor chip 52 and the metal wires 54 therein, and at the same time exposing the outer connecting portions of the lead frame 31 at a bottom surface thereof, and

an inner connecting portion sealing resin for covering the inner connecting portion at the bottom side of the sealing resin 51; wherein

the inner connecting portion sealing resin exists beneath the connecting portion of the inner connecting portion with the metal wires 54;

each of the metal wires 54 is bonded to an upper surface of the inner connecting portion;

a lower surface 66 of the inner connecting portion is offset inwardly of the sealing resin with respect to the bottom surface of the sealing resin 51;

a part of the sealing resin 51 enters an underside of the inner connecting portion to form the inner connecting portion sealing resin.

Glenn is silent about at least a part of the lead terminal portion has a cross-section, that is taken along a plane that is perpendicular to the longitudinal direction of the lead terminal portion, in a shape of an inverted trapezoid. However, in column 10, lines 38-44, Glenn teaches that the perimeter of the surface 64 of lead 63 may have a variety of shapes. Therefore, it would have been obvious to one having ordinary skill in

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the art at the time the invention was made to modify the invention of Glenn so that it would have a part of the lead terminal portion having a cross-section taken along a plane perpendicular to the longitudinal direction of the lead terminal portion in a shape of an inverted trapezoid in order to facilitate different external connections of the device (see column 10, lines 21-44).

Alternatively, fig. 2 of Glenn shows anchor ears 36 on the lead frame 30. It would have been obvious to one having ordinary skill in the art at the time the invention was made that these anchor ears can be easily modified to have any shape, including an inverted trapezoid, as long as such modification provide a prevention of leads 30 from being pulled from the package body (see column 5, lines 1-9), since such modification would involve only routine skills in the art.

Regarding claim 20, Glenn discloses the semiconductor device in which a tapered surface, which comes upwardly as it comes inwardly of the sealing resin, is provided between a lower surface of the outer connecting portion and the lower surface of the inner connecting portion. See figures 2-10.

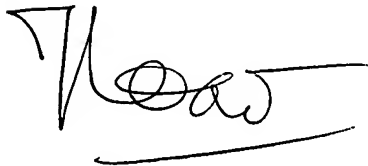
Regarding claim 21, Glenn discloses the semiconductor device in which a bottom surface of the outer connecting portion is exposed from the bottom surface of the sealing resin to form an outer lead portion. See figures 2-10.

Conclusion

11. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao H. Nguyen whose telephone number is (571)272-1791. The examiner can normally be reached on Monday-Friday, 9:00 AM – 6:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571)272-1787. The fax numbers for all communication(s) is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.



Dao H. Nguyen
Art Unit 2818
June 29, 2004



David Nelms
Supervisory Patent Examiner
Technology Center 2800